

HOOKWORM DISEASE

And how to prevent it

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HOOKWORM DISEASE AND HOW TO PREVENT IT.

A pamphlet written for those living in Indian Villages.

In India, and also in many other parts of the world, there exists a disease caused by certain small worms, half an inch or less long, which live in the bowel and feed on its delicate lining. These worms are called hookworms or ankylostomes, and the disease they cause is called hookworm disease or ankylostomiasis. The chief symptoms of the disease are paleness, indigestion, a feeling of being easily tired; the feet often swell, and sometimes the first symptom of all to be noticed is that itching sores appear on the legs and feet. With all these troubles the spleen is not enlarged unless some other disease, such as malaria, is present as well.

Any one with symptoms such as these should go to a doctor and ask him whether he does not think that they are due to hookworms; and if they are, he should immediately take medicine and get rid of the worms. At the same time he must remember that these worms hold on tightly with their teeth to the inside of the bowel, so that it may not be easy to get them away. In fact if there are many of them, the medicine may have to be given several times before they all come away. While the worms are coming away there may be a feeling of some weakness and giddiness, and some burning in the stomach. This is uncomfortable, but it is certainly worth while to have a little trouble of this kind and then to get well and strong again, rather than to get worse and worse and possibly die.

But after all it is far better to prevent these worms from getting into the bowels at all, rather than to let them get in and make the person ill, and then to drive them out.

How are the worms to be prevented from getting into the bowels of yourself or of any one else?

Before you can answer this question you must know the answer to several other questions which I will ask and answer for you. The first question is this :—

In what way do the worms actually get into the bowels?

I have told you that the hookworms live in the bowels of men, women and children. They are what are called parasites, that is to say, they cannot live except inside the body of some other creature, who is called their host. If they leave the body of their host, they die. It is quite clear from this fact that these worms cannot pass directly from one person to another. The manner in which they enter the body of a host is indeed quite different. It happens in this way. The hookworms living in the bowels of some person lay eggs there, and the eggs pass out of their host's body with his excrement. These eggs are so small that they cannot be seen except with the help of an instrument called a microscope; but a doctor who has a microscope can tell you whether your excrement has got these eggs in it, or not. As the excrement lies on the ground a tiny worm grows inside each egg, and after a few hours it hatches out. After it leaves the egg-shell it stays in the excrement and there it lives and grows for one or two weeks. During this time it is fairly easily killed, for instance it will die if it dries up, and it will die if it gets into water. After it has grown in the excrement to a certain size, it cannot grow any more without again entering a human being and becoming a parasite. It is still so very small it cannot be seen except with a microscope. It now leaves the excrement and can live in water, or in moist earth. It can climb up the stalks of grass, if these are wet with dew; and it is very hard to kill. It is ready to enter the body of a human being if it gets the opportunity. If you are walking with bare feet and your skin touches the wet grass or earth in which these tiny worms are living, they will immediately bore through your skin and get into your bowels, and will grow there. The worms are so small that they do not usually cause pain when they pierce the skin, though perhaps they may produce a little itching, and afterwards some sores may appear.

The usual way then in which the hookworms get into the bowels is by piercing the skin when they are very young and very small. No doubt if they are swallowed in water they will get into the bowels, but this is not very likely, for these tiny worms cannot swim. They sink to the bottom of water and live in the mud there, so that if you drink the clear water without stirring up the mud you cannot get infected by the tiny hookworms, even if many of them are lying in the mud below.

We have seen how the hookworms enter the body and probably you will think that all that is required to prevent yourself from being infected is that the excrement of every person in your village, who is sick from hookworm disease, should be so treated that the eggs or the tiny worms are killed. Unfortunately this is not so, and before we can answer our first question we must answer yet two more.

The first of these is :—

Can people have hookworms in their bowels without being ill ?

The answer is that they most certainly can. In some parts of India, 8 out of 10 *healthy* people have hookworms in their bowels. This may seem surprising, but it is quite true, and the explanation is that whether hookworms in the bowels cause illness or not, depends a great deal on how many are living there. If there be only a few, no illness at all is caused. If there be a great number, then the host is ill and has the symptoms mentioned at the beginning of this paper. If there be a moderate number the host will not be actually ill, but he will probably be weakened and be made more likely to fall ill with some other sickness, and, if he fall ill, to die from it, than he would be if he had no hookworms in his bowels. It is very important to remember that a person with only a few hookworms in his bowels is not made ill by them, but that nevertheless his excrement does contain some eggs ; and that most people living in the country in India have got a few hookworms in their bowels.

If you think about this you will see that it is really a most important thing. Suppose, as is probably true, that 8 out of 10 healthy people in your village have a few hookworms eggs in their excrement and that they are passing their excrement in damp places where the tiny worms can form in the eggs and hatch, and suppose this goes on for six months. At the end of that time there will be enormous numbers of the tiny worms in the earth and in the water ; so many that if they can enter two or three people they can make them so ill that they will probably die. Remember that a healthy person who happens to have only a few hookworms in his bowels is a dangerous person, because he may cause illness in someone else.

The second question that we must answer is this :—

**Is it possible that a human being could get hookworms
from the excrement of an animal ?**

We know of three different kinds of hookworms which live in human beings, two of them are common and the third very rare. So far as we know, the two common ones do not live in any other creature to be found in India except human beings. The third one lives in many cats and dogs ; and though we do not yet really know very much about it, it is probably correct to say that it is very rarely found in human beings, and even then in such small numbers that it cannot cause illness. We need not then trouble about the dog and cat hookworms, but only about those which one human being gets from the excrement of another.

You have learnt then so far that you get hookworms from the excrement of other people, that the worms nearly always get into your body by piercing your skin while they are very young and very small, so small indeed that you cannot see them ; that they grow up in your bowels and, if there be enough of them, make you ill ; and lastly that you can be made ill by worms hatching from the excrement of persons who seem quite well. So we can come back to the first question which we asked, namely :—

**How are the worms to be prevented from getting
into the bowels ?**

As you have learnt a good deal since that question was put at the beginning of this pamphlet, we are able to put the question much more definitely and to ask :—

**How is it possible to prevent the very young and very small
worms from entering the skin ?**

You will remember that first the eggs and small worms live in excrement. Next that the small worms leave the excrement and live in earth or mud, and lastly that when they get the opportunity they leave the earth or mud and pierce the skin. In the same way there are three methods by which we can prevent the small worms from entering the skin.

First we can attack them while they are still in the excrement ; and in order to do this it is first necessary that all the excrement should be passed in one place and not scattered about in the fields and jungle. Unless

people will be clean and do this, it is quite impossible to kill all the eggs and all the young worms, and to prevent them from getting into the soil. When the excrement has been collected it is not very difficult to kill the eggs and young worms and there are several ways in which it can be done. One is by burning the excrement and another is by taking it away to some distance from your village and burying it two feet deep in dry earth. Yet a third way is to keep it in a concrete pit for six months; but if this be done there must be water in the pit, and it must be screened so that flies cannot get to it. In some such way as one of these all the eggs in the excrement of every one in the village can be destroyed, and there will be no chance of any hookworms getting into the soil.

Secondly, as regards attacking the young hookworms in the soil. This cannot be done, but at the same time the soil can in time be made clean by collecting all the excrement and destroying it in one of the ways mentioned. If this be done and no more hookworms be allowed to get into the soil, those already in the soil will die in time. We know that they can live for over a year; so that it takes probably two years of clean habits in the village before the soil round the village becomes quite clean.

The third way in which the young and small worms can be prevented from getting into the skin is by preventing water from the soil from touching the skin.

This is a difficult thing to do, for you must remember that these tiny worms are great climbers; even if you wear boots they must be quite water-tight, for if any water is able to get through your boots the worms can come through with it. This is not then a very satisfactory way of keeping out the worms, although, as a help, it is better than walking about in bare feet.

You will understand from what I have written that hookworm disease is a serious thing; that most people living in the country in India have got at least a few hookworms in their bowels without being ill, but that probably these few hookworms weaken them and make them more likely to die if some other illness attack them; and that, if all excrement be properly dealt with, no more hookworms can enter into any one in the village. You have ~~the~~ destruction of hookworms in your

own hands ; and if you can persuade or compel every one in the village to be clean in his habits, you can within $1\frac{1}{2}$ or 2 years have a village which is quite free from hookworm disease, and in which the people will be far healthier and live considerably longer than they do at present. Surely this is worth your while.
